Quality is more than a word

ESPEC

Environmental Stress Chamber

AR series

CAT.NO.E09141-Z906

Advanced reliability
Environmental Stress Chambers for tomorrow's environmental testing needs

Achieving reliability requires a system that delivers results quickly
and reproduces environmental conditions accurately.
ESPEC's Environmental Stress Chambers can withstand heat loads generated by the specimen, improve temperature change rates , and provide expanded ranges for temperature and humidity.
Each chamber is also equipped with a specimen temperature control function
to meet stringent testing demands typically required for automotive parts and mobile products.
ESPEC offers two temperature control ranges: −75℃ to +180℃ and −45℃ to +180℃,
and two test chamber capacities: 680 L and 1100 L.
These models incorporate the most desirable features in temperature and humidity chambers.

ARL-0680

ARS-1100

*Viewing window is optional.

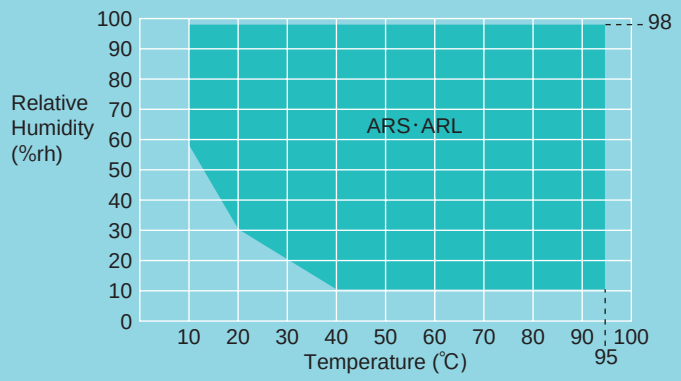
Performance

Temperature change rate

Model	ARL/ARU-0680	ARL/ARU-1100	ARS/ARG-0680	ARS/ARG-1100
Temp. range	−45⇔+180℃		−75⇔+180℃	
Heating (℃/min.)	6.3	4.7	6.0	4.7
Cooling (℃/min.)	4.8	4.4	4.2	4.1

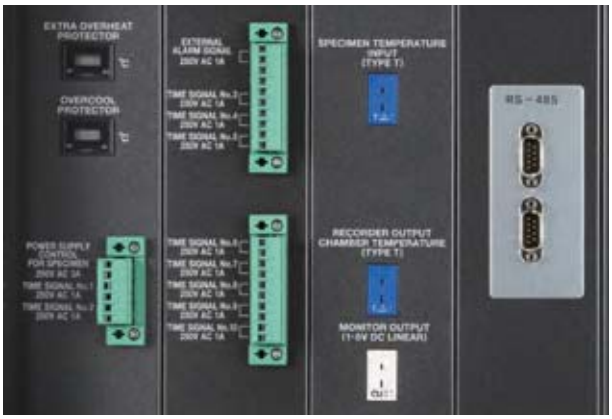
＊No load

Temperature & Humidity Controllable Range
(at + 0℃ ambient temperature, no load)



＊Continuous operation at or below +40℃ is limited because of frost formation on the cooler and dehumidifier.

Specimen temperature control



Terminal area(including option)

Superior temperature heating and cooling control at 3℃/min. with specimen load

Features temperature heating and cooling performance at 4℃/min. (no load), and can handle temperature cycle tests at 3℃/min. (with 50 kg load: −75 to +180℃).

Highly uniform temperature distribution

Highly uniform temperature distribution minimizes variations in test results over multiple specimens.

Reduced temperature and humidity stabilization time

Temperature and humidity stabilization time have been greatly reduced by minimizing hunting as the chamber approaches set-point. (under testing operation from RT to 85℃/85% rh).

Wider control range for temperature and humidity

Features a wider control range of temperature and humidity ranges, including stable control at 95°C/98% rh.

Specimen temperature control function provides accurate testing

Uses a temperature control sensor (×1) to monitor and control the temperature of the specimen.

Utility

Supports heat loads up to 4500 W. (During temperature testing)

Supports electrically-charged specimens, and can withstand up to 4500W of heat load during temperature testing (or 500 W during temperature and humidity testing).

Large-sized chamber provides greater processing capacity

Available in two types with an inside capacity of 680 L and 1100 L.

User-friendly features

The chambers have cable ports on both sides for access from either side, water supply via the standard water tank and pure water service connections, large-sized casters, and an 18-8 Cr-Ni stainless steel plate exterior for resistance against rust and oil.

Meets International standards

Designed to comply with major environmental test standards under IEC60068 (2-1.2.3.14.30.38.78), and ISO16750-4 (5.3).

International safety standards

Conforms with safety standards ISO12100-1, -2, and ISO14121, and to CE marking requirements based on these EU directives: Low voltage directive, EMC directive, machinery directive, and pressure equipment directive.

Network solution

Standard communication support is available with RS-485 or RS-232C interface.
To monitor with a PC or implement remote operation, consult with your ESPEC representative.

Cable ports on both sides

Water tank

Compatible Test Standards

- IEC60068 2-1: Cold
- IEC60068 2-2: Dry heat
- IEC60068 2-3: Damp heat, steady state
- IEC60068 2-14 Nb: Change of temperature with specified rate of change
- IEC60068 2-30: Damp heat, cyclic (12+12h cycle)
- IEC60068 2-38: Composite temperature/ humidity cyclic test
- IEC60068 2-78: Damp heat, steady state
- ISO16750-4 5.3: Temperature cycling

Control operation

Instrumentation

Programmable instrumentation using large screen display

The instrumentation package features flexible, programmable operation with a high-volume memory for running up to 20 operating patterns (99 steps per pattern). Other functions include easier operation, with a 6.5-inch color LCD, touch-key input, graphical display of program patterns, and testing history trend graphs.

Alarm buzzers and displays

In the event of an alarm, a screen appears displaying alarm information and date and time of occurrence, followed by a separate screen displaying the cause and corrective actions.

Built-in timer functions

Built-in timer functions enable automatic start-up or shut down of the chamber at preset times. The timer can be preset by month, date, day, and hour.

Programming details monitor

Program control settings

Specimen temperature control settings

Periodic inspection lists

ARS・ARL −75／−45 to +180℃・10 to 98%rh

TEMPERATURE & HUMIDITY CHAMBER

Model			ARS–0680	ARS–1100	ARL–0680	ARL–1100
Power supply (selectable) *1			200V AC 3φ 3W 50/60Hz, 220V AC 3φ 3W 60Hz, 380V AC 3φ 4W 50Hz, 400V AC 3φ 4W 50Hz			
Maximum load current		200V	63A	70A	53A	56A
		220V	58A	64A	49A	52A
		380V	28A	32A	23A	25A
		400V	27A	29A	22A	23A
Temperature and humidity control system			Balanced Temperature and Humidity Control system (BTHC system)			
Operating conditions			Ambient temperature: 0 to +40℃ Ambient humidity: 75% rh maximum (below dew point at +30℃/75% rh)			
Temperature performance *2	Temperature range		−75 to +180℃		−45 to +180℃	
	Temperature fluctuation		±0.3K			
	Temperature deviation in space		±1.5K			
	Temperature gradient		3.0K			
	Temperature change rate	Heating	6.0 K/min. or more	4.7K/min. or more	6.3K/min. or more	4.7K/min. or more
		Cooling	4.2 K/min. or more	4.1K/min. or more	4.8K/min. or more	4.4K/min. or more
	Allowable heat load		4500 W (test area temperature: at +20℃)			
Temp. & humid. performance *2	Temperature & humidity range		+10 to +95℃/10 to 98% rh			
	Temperature fluctuation		±0.3K			
	Temperature deviation in space		±1.0K			
	Temperature gradient		2.0K			
	Humidity fluctuation		±2.5% rh			
	Allowable heat load		500 W (test area conditions: at +85°C/85% rh)			
Noise level *3			62db	63db	61db	62db
Construction	Exterior material		Stainless steel plate (18-Cr stainless steel plate, hairline finish)			
	Interior material		Stainless steel plate (18-8 Cr-Ni stainless steel plate, BA polish)			
	Insulation		Glass wool + Foamed phenol			
Heater			Nichrome strip wire heater: 3 kW ×2			
Humidifier			18-12-2.5 Cr-Ni-Mo stainless steel plate sheathed heater (surface evaporating system)			
			2 kW ×2	2.5 kW ×2	2 kW ×2	2.5 kW ×2
Cooler	Cooler		Plate fin cooler (Doubles as dehumidifier)			
	Refrigeration system		Mechanical type cascade compression refrigeration system		Mechanical type single-stage refrigeration system	
	Refrigerator		Scroll compressor			
	Condenser		Air cooled condenser			
	Expansion mechanism		Electronic auto-expansion valve system			
	Refrigerator capacity		3.0kW×3.0kW	3.75kW×3.75kW	3.0kW	3.75kW
	Refrigerant		R404A, R23		R404A	
Communication port (selectable)			RS-485, RS-232C			
Fittings			Cable port (right side panel: φ100 mm ×1 and left side panel: φ50mm ×1), Casters (×4), Adjustable feet (×4), Time signal terminals (×2), Specimen power supply control terminal (×1), Specimen temperature input terminal (×1)			
Water supply	Water supply system		Pumping			
	Water tank capacity		40 L (stationary 20 L ×2)			
	Automatic water supply port		Port diameter : Rc 3/8" (Rear panel)			
	Water quality		Conductivity: 0.1 to 10μS/cm, 6 to 7 pH deionized water			
Test area capacity			680 L	1100 L	680 L	1100 L
Test area dimensions (mm) *4			W850×H1000×D800	W1100×H1000×D1000	W850×H1000×D800	W1100×H1000×D1000
Outside dimensions (mm) *4			W1050×H1955×D1805	W1300×H1955×D2005	W1050×H1955×D1805	W1300×H1955×D2005
Weight			615 kg	700 kg	510 kg	600 kg

*1: Power supply voltage fluctuation to be ±10% of rated value. Conforms to CE marking based on EU directives.
*2: Based on ambient temperature +20℃, no specimen. Test chamber performance indicated according to IEC 60068-3-5:2001.
*3: Measured inside a sound proof room 1 m in front of, and 1.2 m above the chamber (ISO 1996-1:2003 A weighting).
*4: Excluding protrusions.

ARG・ARU

−75／−45 to +180℃

TEMPERATURE CHAMBER

Model			ARG−0680	ARG−1100	ARU−0680	ARU−1100
Power supply (selectable) *1			200V AC 3φ 3W 50/60Hz, 220V AC 3φ 3W 60Hz, 380V AC 3φ 4W 50Hz, 400V AC 3φ 4W 50Hz			
Maximum load current		200V	63A	70A	53A	56A
		220V	58A	64A	49A	52A
		380V	28A	32A	23A	25A
		400V	27A	29A	22A	23A
Temperature control system			Balanced Temperature Control system (BTC system)			
Operating conditions			Ambient temperature: 0 to +40℃ Ambient humidity: 75% rh maximum (below dew point at +30℃/75% rh)			
Temperature Performance *2	Temperature range		−75 to +180℃		−45 to +180℃	
	Temperature fluctuation		±0.3K			
	Temperature deviation in space		±1.5K			
	Temperature gradient		3.0K			
	Temperature change rate	Heating	6.0 K/min. or more	4.7K/min. or more	6.3K/min. or more	4.7K/min. or more
		Cooling	4.2 K/min. or more	4.1K/min. or more	4.8K/min. or more	4.4K/min. or more
	Allowable heat load		4500 W (test area temperature: at +20℃)			
Noise level *3			62db	63db	61db	62db
Construction	Exterior material		Stainless steel plate (18-Cr stainless steel plate, hairline finish)			
	Interior material		Stainless steel plate (18-8 Cr-Ni stainless steel plate, BA polish)			
	Insulation		Glass wool + Foamed phenol			
Heater			Nichrome strip wire heater: 3 kW ×2			
Cooler	Cooler		Plate fin cooler			
	Refrigeration system		Mechanical type cascade compression refrigeration system		Mechanical type single-stage refrigeration system	
	Refrigerator		Scroll compressor			
	Condenser		Air cooled condenser			
	Expansion mechanism		Electronic auto-expansion valve system			
	Refrigerator capacity		3.0kW×3.0kW	3.75kW×3.75kW	3.0kW	3.75kW
	Refrigerant		R404A, R23		R404A	
Communication port (selectable)			RS-485, RS-232C			
Fittings			Cable port (right side panel: φ100 mm ×1 and left side panel: φ50mm ×1), Casters (×4), Adjustable feet (×4), Time signal terminals (×2), Specimen power supply control terminal (×1), Specimen temperature input terminal (×1)			
Test area chamber capacity			680 L	1100 L	680 L	1100 L
Test area dimensions (mm) *4			W850×H1000×D800	W1100×H1000×D1000	W850×H1000×D800	W1100×H1000×D1000
Outside dimensions (mm) *4			W1050×H1955×D1805	W1300×H1955×D2005	W1050×H1955×D1805	W1300×H1955×D2005
Weight			610 kg	695 kg	505 kg	595 kg

*1: Power supply voltage fluctuation to be ±10% of rated value. Conforms to CE marking based on EU directives.
*2: Based on ambient temperature +20℃, no specimen. Test chamber performance indicated according to IEC 60068-3-5:2001.
*3: Measured inside a sound proof room 1 m in front of, and 1.2 m above the chamber (ISO 1996-1:2003 A weighting).
*4: Excluding protrusions.

TEMPERATURE AND HUMIDITY CONTROLLER

Operating mode	Program operation, Constant operation
Display	Color TFT LCD display (6.5 inch)
Setting	Analog touch panel method
Program capacity	RAM patterns: 20 program patterns (・99 steps per pattern ・Pattern linking possible) ROM patterns: 10 program patterns
Setting and indication ranges	Temperature: −80℃ to +185℃ (ARS, ARG) −50℃ to +185℃ (ARL, ARU) Humidity: 0 to 100% rh (ARS, ARL) Time: 0 to 999 hours 59 minutes
Setting and indication resolution	Temperature: 0.1℃ Humidity: 1% rh (ARS, ARL) Time: 1 minute
Input	Thermocouple type T (Copper/Copper-Nickel)
Auxiliary functions	Chamber/ specimen temperature control selection Trend graph display Target temperature status Refrigerator capacity automatic control Time signal Integrating hour meter (non-resettable, resettable) Specimen temperature control setting Sensor offset Exposure time control Pausing Complete time display Test end mode selection Input burn-out detection Upper and lower temperature (and humidity) limit alarm Alarm and alarm history display Backup operation Power failure recovery operation Automatic and manual drainage (ARS, ARL) Constant humidity measurement (ARS, ARL) Timer (automatic start-up and stop) Help feature

ANGER

- o not use specimens which are explosive or inflammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or explosion.
- o not place corrosive materials in the chamber. If corrosive substances or liquid is used, the life of the unit may be significantly shortened specifically because of the corrosion of stainless steel, resin and silicone materials.

CAUTION

- Be sure to read the user's manual before operation.
- Please contact us for non-standard specification.

SAFETY DEVICES

- Control circuit overcurrent protection
- Control circuit short circuit protection cartridge fuse
- System trouble
- Reverse-prevention relay
- Thermal fuse
- Air circulator temperature switch
- Air circulator short circuit protection cartridge fuse
- Ambient temperature input burn-out detection circuit
- Dry-bulb temperature input burn-out detection circuit
- Specimen temperature input burn-out detection circuit (only when using specimen temperature control)
- Condenser fan short circuit protection
- Condenser fan overload protection
- Refrigerator temperature sensor burned-out detection circuit
- Refrigerator short circuit protection
- Refrigerator overcurrent protection
- Refrigerator discharge pipe temperature switch
- Refrigerator high/ low pressure switch
- Refrigerator frost detection cicuit
- Refrigerator circuit temperature out of range
- Refrigerator frost trouble detection temperature switch (ARS, ARG)
- Refrigerator discharge pipe temperature trouble detection circuit (ARS, ARG)
- Heater (humidifier) over current protection
- Wet bulb burn-out circuit (ARS, ARL)
- Humidifier boil-dry protector (ARS, ARL)
- Humidifier water level detector (ARS, ARL)
- Water tank empty switch (ARS, ARL)
- Water tank water level low switch (ARS, ARL)
- Dry wick detection (ARS, ARL)
- Overheat protector
- High deviation temperature alarm (built into temperature and humidity controller)
- High/ low absolute temperature (humidity) alarms (built into temperature and humidity controller)
- Specimen power supply control terminal
- Chamber door switch

ACCESSORIES

- Cable port rubber plug ϕ50 mm, ϕ100 mm ..... 1 each
- Shelf bracket ..... 1 set
  stainless (18-8 Cr-Ni stainless steel plate CP grade)
- Shelf 1
  stainless steel wire (18-8 Cr-Ni stainless steel plate)
- Cartridge fuse (type A, 250 V 0.4 A, 5 A, 8 A) ..... 1 each
- Wet-bulb wick (ARS, ARL) ..... 1 box
- Thermocouple for measuring specimen temperature 1
- Specimen temperature input connector 1
- User's manual 1

OPTIONS

Paperless recorder portable type

Records temperature of each section such as the temperature inside the chamber.
[Temperature type]
Temperature range: −100 to +200℃
Number of inputs: Temperature 1
(5 more channels can be turned ON)
Data saving cycle: 5 sec.
External recording media:
CF memory card (128MB)
Language support: ENG, JPN
[Temperature and humidity type]
Temperature range: −100 to +200℃
Humidity range: 0 to 100%rh
Number of inputs:
Temperature 1 / Humidity 1
(4 more channels can be turned ON)
Data saving cycle: 5 sec.
External recording media:
CF memory card (128MB)
Language support: ENG, JPN

Temperature recorder (digital)

- SRJ25 −100 to +200℃ 6 dots
- Portable type

Temperature and humidity recorder (digital)

- SRJ15 −100 to +200℃ / 0 to 100%rh
  6 dots
- Portable type

Temperature sensor terminal

Terminal board for dry bulb temperature sensor in the chamber.

DC output terminals

Outputs temperature, humidity, and temperature of the specimen in the test area.

Relay contact output

The standard 2 relay contacts (time signals) can be modified to 10 contacts.

Cable port

A through hole of 50, or 100mm dia. is provided on the wall (right or left side) of the chamber to allow electrical cables to be introduced into the chamber.
*Equipped with rubber plug.

Cable port rubber plug

The additional silicon sponge rubber port plug.

Humidifier delay control

To protect specimens from condensation, humidity control starts after temperature reaches the set value.
(ARS, ARL only)

Viewing window

Allows observation of specimens inside the chamber.
Size: 340W × 440H mm

OPTIONS

Shelf, Shelf bracket

Standard specification shelves and shelf brackets are added as required.

Load resistance shelf

Use load resistance shelf when the total weight of the specimens exceeds the maximum allowable load of the standard shelf.

・Type 1 to 4: up to 50kg
(max. of two shelves)

*ARS, ARL, ARG, ARU-0680 only

Condenser filter

Prevents condenser fins from clogging.

External alarm terminal

If the safety device of the chamber activates, the alarm is notified to a distance via the external alarm terminal.

Emergency stop switch

Stops the chamber immediately.

Trouble buzzer

If a malfunction occurs, the buzzer sounds to warn you of the malfunction.

Additional overheat protector

To prevent overheating inside the chamber and prevent the specimens from being damaged, an upper temperature limit alarm and overheat protector have been incorporated in the chamber as standard. An additional overheat protector can be installed.

Overcool protector

If the temperature inside the chamber decreases excessively, the chamber stops operating to prevent the specimens from being damaged.

Rotating type warning signal light

A signal light to light up when malfunction occurs. (available in red or yellow color)

Water purifier

Water purifier with reverse osmosis membrane. Produces approx 6.6L per hour (at primary water temp. +10℃).

・WS-1

When installing chamber on upper floor with water purifier, a water leak detector (sold separately) is recommended to be equipped in case water leaks.

Portable tank

Allows manual water supply to the tank for humidity testing.
(ARS, ARL only)

Communication function

Connects chamber to a personal computer, enabling operation control of the chamber.

・GPIB

Power cable

・2.5, 5, 10m

*The chamber does not come with a power cable.

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JSA QMS JIS Q 9001 JSAQ 004

MS JAB CM001

MS JAB CM021

ISO 14001 JACO EC99J2046

UKAS ENVIRONMENTAL MANAGEMENT 051

ISO 9001/JIS Q 9001
Quality Management System Assessed and Registered

ESPEC CORP. has been assessed by and registered in the Quality Management System based on the International Standard ISO 9001:2000 (JIS Q 9001:2000) through the Japanese Standards Association (JSA).

ISO 14001 (JIS Q 14001)
Environmental Management System Assessed and Registered

ESPEC GROUP
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